Exercise Week11

Pi (π)

The mathematical constant Pi is an irrational number with value approximately 3.141592... The precise value of this constant can be obtained from the following infinite sum:

$$Pi^2 = 8 + 8/3^2 + 8/5^2 + 8/7^2 + 8/9^2 + ...$$

(Pi is of course just the square root of this value.)

Although we cannot compute the entire infinite series, we get a good approximation of the value of Pi^2 by computing the beginning of such a sum.

Please use both iterative way and recursive way in two different functions to solve this problem. Write two functions approxPIsquared_iter() and approxPIsquared_recur() that takes numbers included in the series as input and approximates constant Pi^2.

Notes:

1. The values returned by the functions are Pi^2, don't forget to find the square root.
2. Output Pi to 6 decimal places.

```
1 %%shell
2
3 g++ W11Sol_Pi.cpp -o W11Sol_Pi
4 ./W11Sol_Pi
```

```
How many numbers are in the series?:500
(iterative) By including 500 numbers in the series, the approximated Pi is 3.14095596951
It takes 6.1e-05 secs
(recursive) By including 500 numbers in the series, the approximated Pi is 3.14095596951
It takes 8.4e-05 secs
```

```
1 %%shell
2
3 g++ W11Sol_Pi.cpp -o W11Sol_Pi
4 ./W11Sol_Pi
```

```
How many numbers are in the series?:50000
(iterative) By including 50000 numbers in the series, the approximated Pi is 3.14158628739
It takes 0.000279 secs
(recursive) By including 50000 numbers in the series, the approximated Pi is 3.14158628739
It takes 0.001512 secs
```

Please name your .ipynb file as YourID_Week11.ipynb and upload it to moodle system.

(ex. H3700001_Week11.ipynb)